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Five New Species of *Nannosquilla* from the Northwestern Atlantic (Crustacea: Stomatopoda)

DAVID K. CAMP

and

RAYMOND B. MANNING

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 368

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ABSTRACT

Camp, David K., and Raymond B. Manning. Five New Species of *Nannosquilla* from the Northwestern Atlantic (Crustacea: Stomatopoda). *Smithsonian Contributions to Zoology*, number 368, 15 pages, 9 figures, 1982.—Species of *Nannosquilla* in the western Atlantic can be placed in two major groups based on morphological differences of the uropod and telson. The first group presently contains six recognized species. Three new species belonging to this group are described, including two (*N. baliops* and *N. whitingi*) known only from off the coast of Florida, USA, and one (*N. taguensis*) from St. Croix, U.S. Virgin Islands. The second group presently contains two species; two additional species (*N. adkisoni* and *N. heardi*) are described herein, both from the eastern Gulf of Mexico.

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Five New Species of *Nannosquilla* from the Northwestern Atlantic (Crustacea: Stomatopoda)

David K. Camp
and Raymond B. Manning

Introduction

For several years, diminutive stomatopod crustaceans belonging to the American genus *Nannosquilla*, family Nannosquillidae, and not clearly identifiable with any of the eight West Atlantic species now recognized, have accumulated in the collections of the Florida Department of Natural Resources Marine Research Laboratory (FDNRMRL) and the Department of Invertebrate Zoology at the Smithsonian Institution. The problems encountered by D.K.C. in trying to identify the specimens collected off the coast of Florida led us to collaborate on a study of these specimens.

Recent studies on the stomatopods have suggested that habitat preferences in members of the genus *Nannosquilla* are very specific and that morphological differences can be relatively minor in closely related species that occupy different habitats. For example, the East Pacific species *Nannosquilla decemspinosa* (Rathbun, 1910) has proved to be extremely abundant on sand beaches in the intertidal zone (Manning, unpublished data); a similar species, *N. canica* Manning and Reaka, 1979, occurs subtidally. Off Costa Rica, both species occur together but again in different habitats (Reaka and Manning, 1980).

West Atlantic species of *Nannosquilla* appear to fall into two major morphological groups. One is centered around *N. grayi*, with the inner spine of the basal prolongation of the uropod distinctly longer than the outer and usually with five or fewer fixed teeth and denticles on the telson margin lateral to each movable submedian tooth. Species falling into this category include: *N. dacostai* Manning, 1970 (Brazil), *N. grayi* (Chace, 1958) (Massachusetts), *N. hancocki* (Manning, 1961) (Venezuela), *N. schmitti* (Manning, 1962) (Caribbean), *N. taylori* Manning, 1969 (West Florida), and *N. vasquezi* Manning, 1979 (Panama). Of these species, *N. schmitti* has more than five fixed teeth and denticles on each posterolateral margin of the telson.

Only one of the species in the first group, *N. grayi*, exceeds a length of 28 mm as an adult; specimens of *N. grayi* as large as 42 mm are known, and most of the specimens reported in Manning (1969) are more than 35 mm long. Maximum reported lengths of the remainder of the species are: *N. dacostai*, 19 mm; *N. hancocki*, 21 mm; *N. schmitti*, 25 mm; *N. taylori*, 28 mm; and *N.*

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vasquezi, 23.5 mm. Thus adults of most species are less than 30 mm long.

Latitudinal gradients in overall size have been recorded in some decapods. Abele (1973:380) reported that in the grapsid crab *Sesarma (Sesarma) reticulatum* (Say, 1817), specimens from Massachusetts had carapace widths of 26–27 mm, whereas specimens from southern localities had carapace widths of 13–16.5 mm. Such gradients have not been observed in stomatopods.

Species in the first group are known to occur from the intertidal zone to a depth of 40 m, as follows: *N. dacostai*, 23 m; *N. grayi*, near intertidal to 3–4 m; *N. hancocki*, 4–40 m; *N. schmitti*, near intertidal to 8 m; *N. taylori*, 1.8 m; *N. vasquezi*, near intertidal.

We describe here three additional species belonging to this group. One, *N. taguensis*, is clearly distinguishable from all other species based on morphological features. The other two species, *N. baliops* and *N. whitingi*, are so similar to *N. grayi* that at first we identified both with that species. However, the size difference between *N. grayi* on one hand, and *N. baliops* and *N. whitingi* on the other, and the differences in color pattern among them led us to distinguish the new species. For this study we reexamined all but one of the specimens of *N. grayi* reported in Manning (1969:78). As a result of that review, we determined that all of the specimens of *N. grayi* exhibit the same kind of stellate chromatophores, suggesting that they were not affected by preservative, and that the color differences we observed did not result from action of the preservative or condition of the chromatophores at the time of collection (whether expanded or contracted). We have prepared two figures from material of *N. grayi* (Figures 1, 2) to illustrate variation within that species for comparison with the similar taxa described herein, as well as one figure showing the chromatophore pattern of parts of the three species together to show differences in chromatophores and their patterns (Figure 3). *Nannosquilla baliops* and *N. whitingi* were taken in the same general area off Hutchinson Island on the east coast of Florida, where they appeared to share a similar habitat, yet their color patterns in preservative are so distinctive that we have no hesitation in recognizing them as distinct species.

We were unable to locate the specimen from Georgia identified with *N. grayi* by Manning (1969:78). We suspect that it will prove to be conspecific with either *N. baliops* or *N. whitingi* rather than with *N. grayi*.

The other group of species is centered around *N. antillensis* (Manning, 1961) (Caribbean Sea). In it, the spines of the basal prolongation of the uropod are subequal in length or the outer spine is distinctly longer, and there are more than five fixed teeth and denticles on the telson margin lateral to each movable submedian tooth. One other species, *N. carolinensis* Manning, 1970 (North Carolina), is included in this group.

Specimens of *N. antillensis* are not known to exceed 24.5 mm, whereas those of *N. carolinensis* are smaller, 18 mm. Both species occur sublittorally, *N. antillensis* in 4–9 m of water and *N. carolinensis* in 100 m.

Two new species are recognized in this group, *N. adkisoni* and *N. heardi*, both from subtidal localities in the eastern Gulf of Mexico. Both of these appear to be more closely related to *N. carolinensis* than to *N. antillensis*.

We reexamined available specimens of *N. antillensis* and were surprised to find that they exhibited considerable morphological variation and may represent several taxa. Not all of the known specimens were available, so we have deferred publishing our observations on *N. antillensis* until we can examine more material.

Original citations for most of the species discussed herein are given in Manning (1969). Literature citations for species described since 1969 are included in our bibliography (Manning, 1970, 1979; Manning and Reaka, 1979).

Measurements used herein were defined in Manning (1969:9, 10); total length is abbreviated as TL, carapace length as CL.

Specimens have been desposited in the National Museum of Natural History, Smithsonian Institution, under USNM catalog numbers, and in the invertebrate reference collection of the

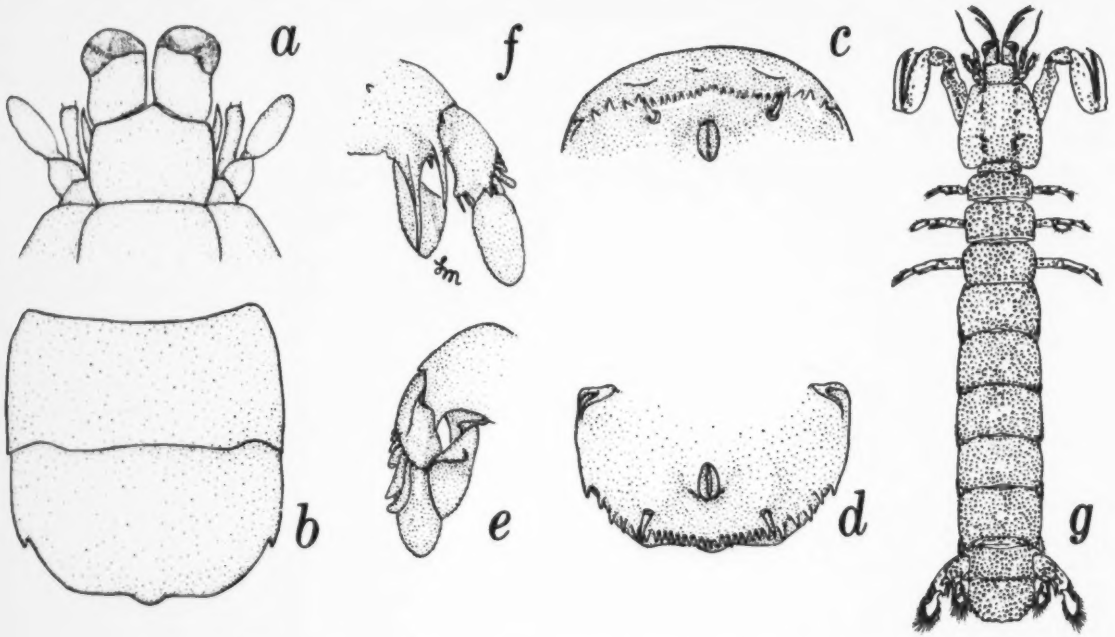

FIGURE 1.—*Nannosquilla grayi* (Chace, 1958), female holotype, TL 40 mm: *a*, anterior part of body; *b*, sixth abdominal somite and telson; *c*, telson, posterior view; *d*, telson, ventral view; *e*, right uropod, dorsal view; *f*, right uropod, ventral view. After Chace (1958), *g*, whole animal.

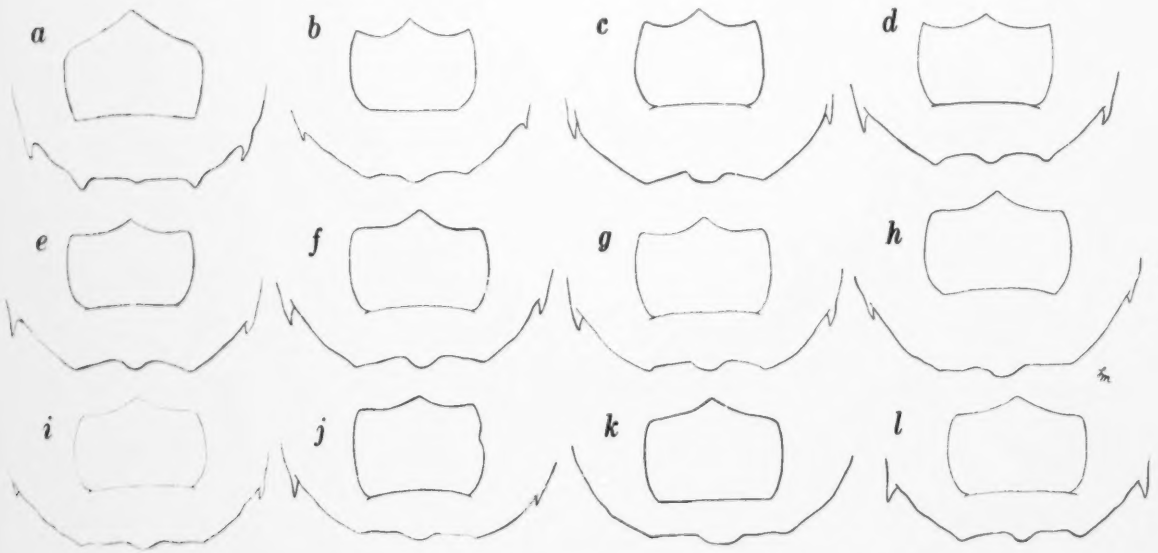

FIGURE 2.—*Nannosquilla grayi* (Chace, 1958), rostral plate and posterior margin of telson: *a*, male, CL 2.9 mm; *b*, male, CL 5.0 mm; *c*, female, CL 5.3 mm; *d*, male, CL 5.3 mm; *e*, female, CL 5.4 mm; *f*, male, CL 5.5 mm; *g*, female, CL 5.7 mm; *h*, male, CL 5.7 mm; *i*, female, CL 5.8 mm; *j*, female, CL 6.0 mm; *k*, female, CL 6.0 mm; *l*, male, CL 6.0 mm. All from Massachusetts.

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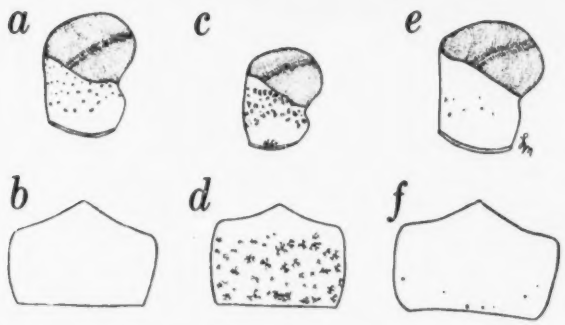

FIGURE 3.—*Nannosquilla balnops*, new species, female holotype, TL 23 mm: *a*, eye, *b*, rostral plate. *N. grayi* (Chace), female holotype, TL 30 mm: *c*, eye, *d*, rostral plate. *N. whitingi*, new species, female paratype, TL 28 mm: *e*, eye, *f*, rostral plate.

Florida Department of Natural Resources, Marine Research Laboratory, St. Petersburg (FSBC I).

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Family NANNOSQUILLIDAE Manning, 1980

Nannosquilla Manning, 1963

Nannosquilla adkisoni, new species

FIGURE 4

MATERIAL EXAMINED.—USNM 184173, holotype, 1♂, TL 17 mm; West Florida Shelf, 28°25′N, 84°19′W; 35–42 m, dredge, R/V *Bellows*; S.B. Collard and D.L. Adkison, collectors; 30 June 1977.

DESCRIPTION.—Eye small, not extending beyond antennular peduncle; cornea set obliquely on stalk, slightly expanded laterally. Ocular scales fused basally; apices distinct, rounded.

Antennular peduncle short, about half length of carapace; flagella short, upper with 12 articles, longer lower with 11 free articles, shorter with 5 free articles. Antennular processes visible as anteriorly directed spines projecting beyond sides of rostral plate.

Antennal peduncle short, not extending beyond eye; flagellum with 10 articles. Antennal scale short, barely reaching midpoint of last segment of peduncle.

Rostral plate subquadrate, slightly wider than long, covering proximal three-fifths of ocular peduncles. Lateral margins of plate subparallel, slightly convex, scarcely diverging anteriorly. Anterolateral corners rounded, not forming right angle. Anterolateral margins concave, gently sloping to obtuse apex, latter projecting little beyond anterolateral corners.

Mandibular palp absent. Four epipods present.

Dactylus of raptorial claw with 8 or 9 teeth; proximal notch on outer margin of dactylus flanked by subacute proximal lobe and broadly rounded distal lobe. Carpus lacking spine at distal end of upper margin.

Basal segment of walking leg not produced into posteromesial lobe.

Sixth abdominal somite with posterolateral corners subacute, not produced as spines.

Telson short, wider than long; dorsum with short, very shallow sulcus on each side of median projection of false eave, converging anteriorly to level of dorsal pit. Median projection of false eave subtriangular, narrow, flanked by nearly straight, slightly sinuous margins; latter sloping to level of submedian projections; lateral margins of eave broadly rounded; eave merges with true margin at about level of fourth fixed lateral tooth. Marginal armature on each side of midline consisting of 6 or 7 submedian denticles, 1 movable submedian tooth originating anterior to and slightly lateral to last submedian denticle, and 7 fixed lateral teeth and denticles.

Basal segment of uropod with ventral, proximal

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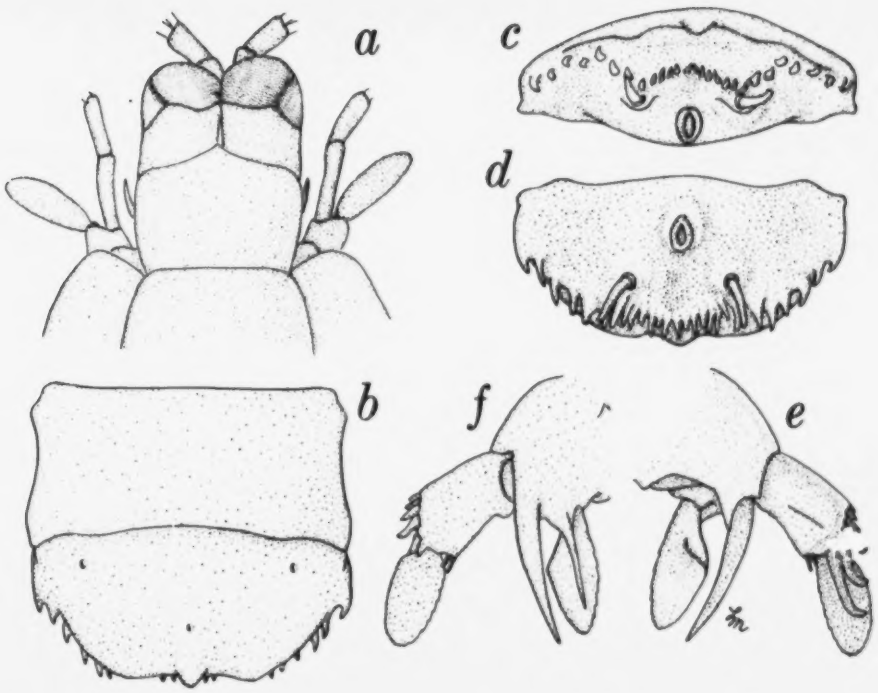

FIGURE 4.—*Nannosquilla adkisoni*, new species, male holotype, TL 17 mm: *a*, anterior part of body; *b*, sixth abdominal somite and telson; *c*, telson, posterior view; *d*, telson, ventral view; *e*, right uropod, dorsal view; *f*, right uropod, ventral view.

lobe; dorsal spine of basal segment not reaching midpoint of endopod; outer spine of basal prolongation longer than inner. Proximal segment of exopod with 2 nonplumose, stiff setae on inner distal corner and graded series of 6 spatulate spines on outer distal margin.

Color in alcohol, pale tan with few chromatophores.

SIZE.—TL of holotype (only known specimen) 17 mm; other measurements (in mm): CL 3.0; rostral plate length 1.0, width 1.3; telson length 1.3, width 2.4; antennal scale length 0.65.

REMARKS.—This species is very similar to *Nannosquilla carolinensis* Manning, 1970, but differs from it in that the anterolateral corners of the rostral plate are more broadly rounded, the posterolateral corners of the sixth abdominal somite are subacute instead of rounded, the submedian depressions flanking the median projection of the false eave on the telson are wider and almost straight rather than being narrow and rounded, and the outer spine of the basal prolongation of the uropod is longer than, not subequal to, the inner. Further, there are six rather than five spatulate spines and two rather than three or four stiff setae on the uropod.

Two meristic features are not bilaterally equal on the holotype of this species. There are eight teeth on the dactylus of the left raptorial claw and nine teeth on the right claw. Also, there are six submedian denticles on the left side of the posterior margin of the telson and seven denticles on the right.

DISTRIBUTION.—Known only from the type-locality on the West Florida Shelf in 35–42 m depths.

ETYMOLOGY.—The species is named for Daniel L. Adkison, Tulane University, who helped collect the only known specimen and made it available for study.

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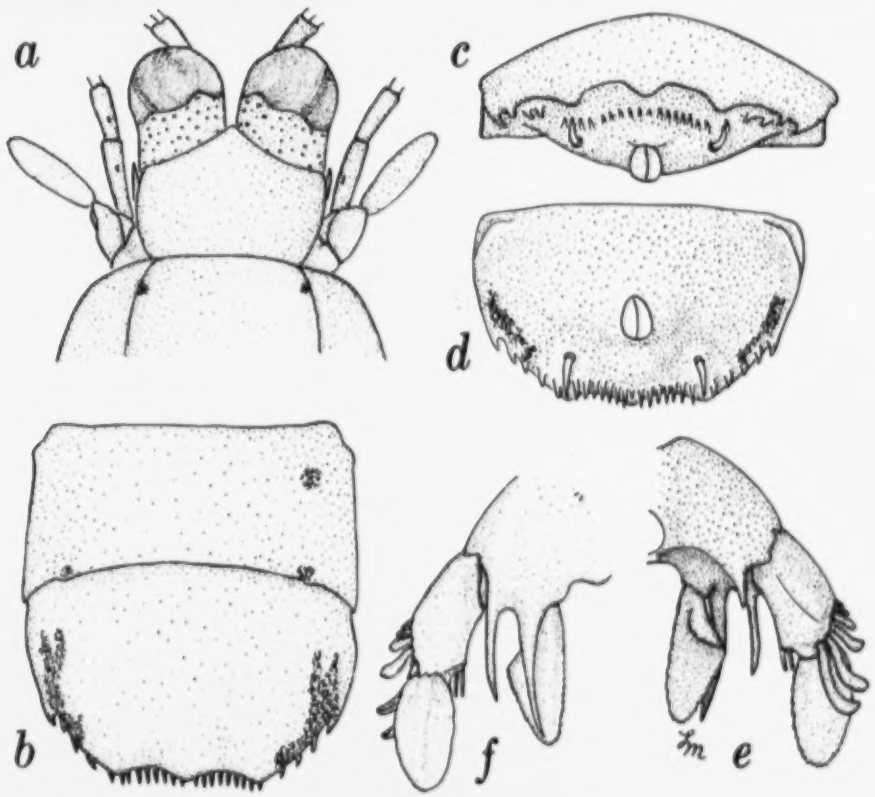

FIGURE 5.—*Nannosquilla baliops*, new species, female holotype, TL 23 mm: *a*, anterior part of body; *b*, sixth abdominal somite and telson; *c*, telson, posterior view; *d*, telson, ventral view; *e*, right uropod, dorsal view; *f*, right uropod, ventral view.

Nannosquilla baliops, new species

FIGURES 3*a,b*, 5

Nannosquilla grayi.—Camp, Whiting, and Martin, 1977:13, 44[listed]. [Not *Nannosquilla grayi* (Chace, 1958).]

MATERIAL EXAMINED.—USNM 184174, holotype, 1♀, TL 23 mm; off Hutchinson Island, St. Lucie County, Florida, 27°21.6′N, 80°13.2′W; 11.2 m; R.M. Gallagher, S.P. Cobb, and C.R. Futch, collectors; 3 November 1971.

DESCRIPTION.—Eye small, not extending beyond antennular peduncle; cornea set obliquely on stalk, expanded laterally. Ocular scales fused basally; apices distinct, rounded.

Antennular peduncle short, less than half length of carapace; flagella short, upper with 11 articles, longer lower with 9 free articles, shorter with 4 free articles. Antennular processes visible as anteriorly directed spines projecting beyond sides of rostral plate.

Antennal peduncle short, not extending beyond eye; flagellum with 12 articles. Antennal scale short, extending beyond midpoint of last segment of peduncle.

Rostral plate subpentagonal, slightly wider than long, covering proximal half of ocular peduncles. Lateral margins of plate convex. Anterolateral corners obtuse. Anterolateral margins slightly concave, merging to obtuse apex; apex extending well beyond anterolateral corners.

Mandibular palp absent. Four epipods present.

Dactylus of raptorial claw with 11 or 12 teeth;

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proximal notch on outer surface of dactylus flanked by subacute proximal lobe and rounded distal lobe. Carpus lacking spine at distal end of upper margin.

Basal segment of walking leg produced as posteromesial lobe.

Sixth abdominal somite with posterolateral corners produced as acute spines.

Telson short, wider than long, dorsum smooth. Median projection of false eave narrow, subtriangular, with rounded apex scarcely produced beyond submedian projections. Submedian depressions of eave wide. Apices of submedian projections of eave obtusely rounded. Marginal armature consisting of single, short denticle on midline and, on either side, 7 submedian denticles, 1 movable submedian tooth originating anterior to and lateral of last submedian denticle, and 5 fixed lateral teeth and denticles.

Basal segment of uropod with ventral, proximal tubercle; dorsal spine of basal segment short, not extending to midpoint of endopod; inner spine of basal prolongation longer than outer. Proximal segment of exopod with 2 nonplumose, stiff setae on inner distal corner and graded series of 6 spatulate spines on outer distal margin.

Color in alcohol, pale tan with few, sparsely scattered, stellate chromatophores evenly distributed over entire dorsum; many subcircular, nonstellate spots on ocular peduncles; posterolateral margins of telson with irregular dark area paralleling lateral margins, especially on ventral surface.

SIZE.—TL of female holotype (only known specimen) 23 mm; other measurements (in mm): CL 3.2; rostral plate length 1.2, width 1.8; telson length 1.9, width 3.1; antennal scale length 0.9.

REMARKS.—*Nannosquilla baliops* is very similar to *N. grayi* (Chace, 1958) but differs in its overall size, the shape of its rostral plate, and the type of chromatophores on its ocular peduncles. *Nannosquilla grayi* is the largest species of the genus presently known, attaining an overall length of up to 42 mm. In contrast, the only known specimen of *N. baliops*, an adult female, is only 23 mm long, approximating the size of most species of *Nannosquilla*. The shape of the rostral plate of *N. grayi* varies somewhat in that the anterolateral corners may be more or less rounded (Figure 2*e–i*, *k*, *l*). However, the generally subquadrate shape appears to be constant in all of the adult specimens examined. In the single adult of *N. baliops*, the rostral plate is subpentagonal, with the anterolateral corners forming an obtuse angle, similar to the shape found in a young *N. grayi* (Figure 2*a*). Finally, the chromatophores on the ocular peduncles of *N. grayi* are broad and stellate in all specimens examined (Figure 3*c*, *d*), whereas the chromatophores on the ocular peduncles of *N. baliops* are small, subcircular spots (Figure 3*a*). The stellate nature of the chromatophores on the eyes of *N. grayi* makes them appear to be densely distributed on the surface of the peduncles. The spots do not appear to be so dense on *N. baliops* because, even though there may be as many present, their compactness leaves more unpigmented space between them.

Differences between *N. baliops* and *N. whitingi* are discussed under the account of the latter species.

DISTRIBUTION.—Known only from the type-locality on the lower east coast of Florida in 11.2 m depth. Sediments from the sample containing *N. baliops* consisted of very coarse, poorly-sorted shell hash containing less than 5 percent nonbiogenic, quartose sand and less than 0.05 percent silt-clay fraction (Gallagher, 1977; FDNRMRL, unpublished data).

ETYMOLOGY.—The specific epithet is from the Greek *balios* (spotted) plus *ops* (eye), referring to the subcircular spots on the ocular peduncles.

Nannosquilla heardi, new species

FIGURE 6

MATERIAL EXAMINED.—USNM 184175, holotype, 1♂, TL 18 mm; about 51 miles due W of Sanibel Island Light, Lee County, Florida, 26°24.5′N, 82°59.0′W; 39 m, dredge, R/V *Hernan Cortez*; E. Bousfield, R. Heard, and D. Camp, collectors; 29 March 1978.

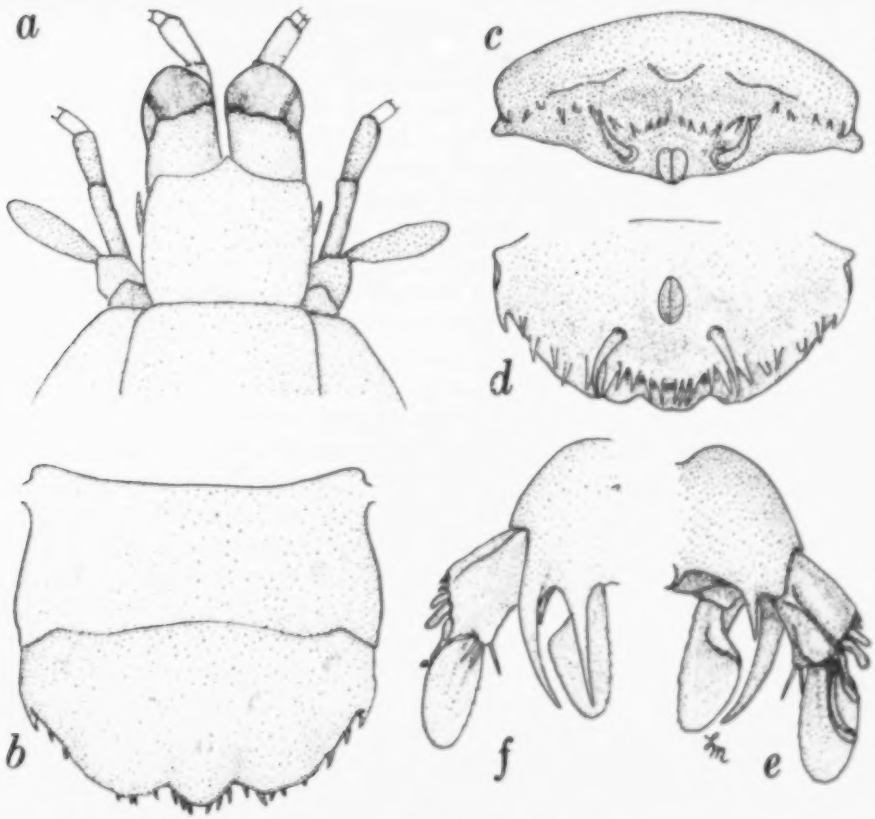

FIGURE 6.—*Nannosquilla heardi*, new species, male holotype, TL 18 mm: *a*, anterior part of body; *b*, sixth abdominal somite and telson; *c*, telson, posterior view; *d*, telson, ventral view; *e*, right uropod, dorsal view; *f*, right uropod, ventral view.

DESCRIPTION.—Eye small, not extending beyond antennular peduncle; cornea set obliquely on stalk, expanded laterally. Ocular scales fused basally and for most of their length; apices distinct, rounded.

Antennular peduncle short, about half length of carapace; flagella of holotype broken. Antennular processes visible as anteriorly directed spines projecting beyond sides of rostral plate.

Antennal peduncle short, not extending to end of eye; flagellum of holotype with 10 (left) and 11 (right) articles. Antennal scale short, extending to about midpoint of last segment of peduncle.

Rostral plate subquadrate, very slightly wider than long, covering posterior half of ocular peduncles; dorsum flat. Lateral margins subparallel, convex. Anterolateral corners rounded. Anterolateral margins concave, converging to obtuse medial apex; apex projecting anteriorly beyond anterolateral corners.

Mandibular palp absent. Four epipods present.

Dactylus of raptorial claw with 9 teeth; proximal notch on outer margin flanked by acutely rounded proximal lobe and broadly rounded distal lobe. Carpus with prominent, acute lobe at distal end of upper margin. (Left claw of holotype missing.)

Basal segment of walking leg produced as posteromesial lobe.

Sixth abdominal somite with posterolateral corners acute but not produced as spines.

Telson short, wider than long; dorsum with

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short, shallow sulcus on each side of median projection of false cave, converging anteriorly to level of dorsal pit. Median projection of false cave prominent, ventrally curved posteriorly, tapering to narrow apex, flanked on each side by narrow, deeply concave depressions; submedian projections of cave broadly rounded, with small, subacute projection at apex of each; cave merges with true margin at about level of last fixed lateral tooth. Marginal armature on each side of midline consisting of 4 submedian denticles in curved row, 1 movable submedian tooth originating anterolaterally of last submedian denticle and anterior to first fixed lateral tooth, and 7 fixed lateral teeth and denticles, the third, fourth, and sixth more slender than the others.

Basal segment of uropod with proximal spine; dorsal spine of basal segment not reaching midpoint of endopod; outer spine of basal prolongation longer than inner, but both projecting posteriad subequally. Proximal segment of exopod with 3 nonplumose, stiff setae on inner distal corner and graded series of 6 spatulate spines, first minute, on outer distal margin.

Color, pale tan in alcohol, with few small, stellate chromatophores scattered irregularly over body.

Size.—TL of holotype (only known specimen) 18 mm; other measurements (in mm): CL 3.2; rostral plate length 1.1, width 1.3; telson length 1.4, width 2.6; antennal scale length 0.77.

Remarks.—This species closely resembles *N. carolinensis* Manning, 1970, but differs from it in the following features: the dactylus of the raptorial claw has nine teeth rather than eight; the posterolateral corners of the sixth abdominal somite are acute, not rounded; the median projection on the false cave of the telson is more prominent because the submedian depressions are deeper than those on *N. carolinensis*; there are four rather than six submedian denticles on the posterior margin of the telson; there are six rather than four or five spatulate spines on the outer margin of the proximal segment of the exopod of the uropod.

Nannosquilla heardi also superficially resembles *N. antillensis* (Manning, 1961), but can be immediately distinguished from the latter by the following features: the anterolateral corners of the rostral plate are rounded rather than acute; the plate covers the proximal half of the ocular peduncles rather than barely covering the posterior margins of the peduncles; there are nine rather than seven or eight teeth on the dactylus of the raptorial claw; and the posterolateral corners of the six abdominal somite are not produced as spines, although they are acute.

Distribution.—Known only from the type-locality on the West Florida Shelf in 39 m depth. Sediments in the sample consisted of dark gray, medium sand with about 15 percent silt-clay particles.

Etymology.—The species is named for Richard W. Heard, Gulf Coast Research Laboratory, Ocean Springs, Mississippi, who found the only known specimen.

Nannosquilla taguensis, new species

Figure 7

Material Examined.—USNM 184176, holotype, 1♀, TL 16 mm; lagoon of Tague Bay, St. Croix, U.S. Virgin Islands, about 50 m from backreef in vertical burrow on side of *Callianassa* mound in fine coralline sand; depth, about 7 m; T. Suchanek, E. Bird, C. Shoemaker, M. Reaka, and S. Kudla, collectors; April 1979. USNM 184177, paratype, 1♀, TL 16.5 mm, data as for holotype. USNM 184178, paratype, 1♀, TL 17 mm; Central Tague Bay, St. Croix, U.S. Virgin Islands; 6 m; T. Suchanek and C. Shoemaker, collectors; 15 April 1979.

Description.—Eye small, not extending beyond antennular peduncle; cornea set obliquely on stalk, expanded laterally. Ocular scales fused basally; apices distinct, angular.

Antennular peduncle short, about half length of carapace; flagella short, upper with 8 articles, longer lower with 7 free articles, shorter with 3 free articles. Antennular processes visible as anteriorly directed spines projecting beyond sides of rostral plate.

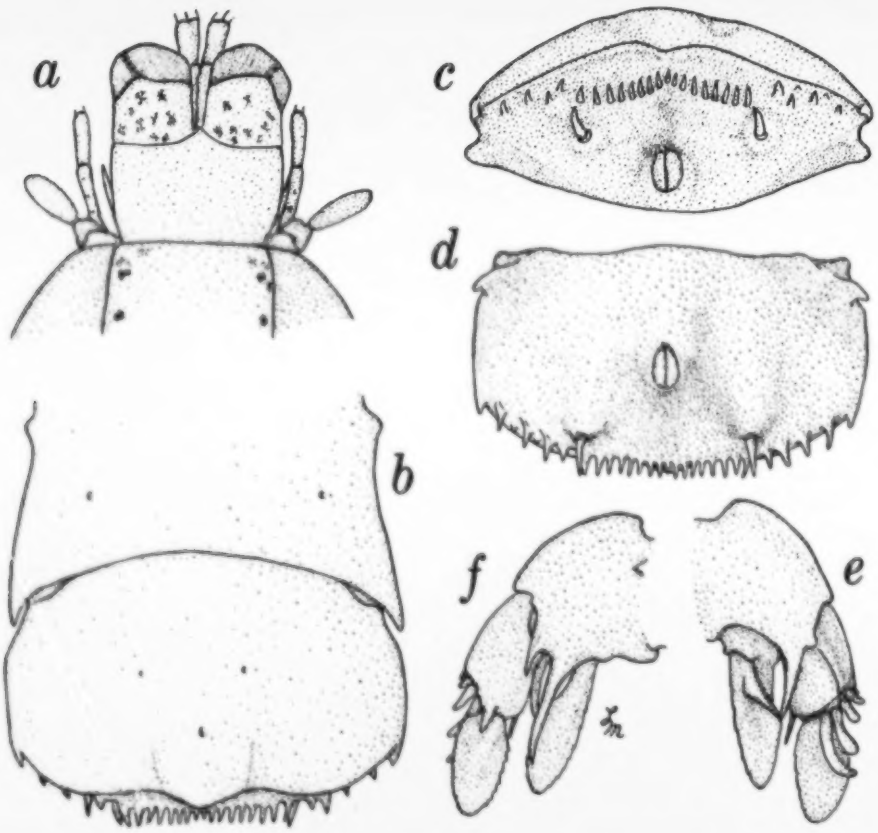

FIGURE 7.—*Nannosquilla taguensis*, new species, female holotype, TL 16 mm: *a*, anterior part of body; *b*, sixth abdominal somite and telson; *c*, telson, posterior view; *d*, telson ventral view; *e*, right uropod, dorsal view; *f*, right uropod, ventral view.

Antennal peduncle short, not extending beyond eye; flagellum with 8 articles. Antennal scale very short, not reaching end of penultimate segment of peduncle.

Rostral plate subrectangular, wider than long, covering proximal half of ocular peduncles; medial area of dorsum slightly depressed; submedial areas slightly elevated, conforming to shape of ocular peduncles; lateral areas curving ventrally. Lateral margins of plate very slightly convex, subparallel proximally, slightly divergent distally. Anterolateral corners almost forming right angle, not acute. Anterolateral margins almost straight, very slightly concave, gently sloping to acute apex; apex barely produced beyond anterolateral corners.

Mandibular palp absent. Four epipods present.

Dactylus of raptorial claw with 7–10 teeth; proximal notch on outer margin of dactylus flanked by subacute proximal lobe and rounded distal lobe. Carpus with prominent, sharp, elevated spine at distal end of upper margin.

Basal segment of walking leg not produced as posteromesial lobe.

Sixth abdominal somite with posterolateral corners produced as long, acute spines.

Telson short, wider than long, very inflated; dorsum with submedian, shallow, wide sulci on posterior third, extending from area anterior of prominent, medial dorsal pit posteriorly to each side of median projection of false eave. Median projection of false eave broadly rounded, scarcely

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produced, flanked by very shallow, broadly rounded depressions; lateral margins of eave and posterolateral corners of telson broadly rounded; eave very inflated laterally, converging with true margin lateral to outer fixed teeth, almost obscuring latter. Marginal armature consisting of occasional single, short denticle on midline and, on either side, 7 or 8 submedian denticles, 1 movable submedian tooth originating immediately anterior to outermost submedian denticle, and 5 fixed teeth or denticles; small tubercle usually situated slightly above and between fixed teeth 2 and 3 and 3 and 4; tubercles sometimes absent or barely discernible.

Basal segment of uropod with ventral, proximal, elongate spine; dorsal spine of basal segment elongate, overreaching midpoint of endopod; inner spine of basal prolongation much longer than outer; outer spine very short, extending just beyond midpoint of inner margin of first segment of exopod. Proximal segment of exopod with 1 nonplumose, stiff seta on inner distal corner and graded series of 4 or 5 spatulate spines on outer distal margin.

Color in alcohol, white; numerous small, light brown, stellate chromatophores scattered over most of dorsum. One specimen (USNM 184177) with additional chromatophore pattern as follows: circular, dark spots at each corner of gastric region of carapace; exposed thoracic somites 5–8 with prominent submedian spots on anterior half of each somite, those on segments 6 and 7 largest; abdominal somites 1–5 with prominent submedian spots in middle of dorsum.

SIZE.—TL of holotype 16 mm; other measurements (in mm): CL 2.5; rostral plate length 0.8, width 1.2; telson length 1.3, width 2.2; antennal scale length 0.4.

REMARKS.—This new species can be immediately distinguished from any other western Atlantic species of *Nannosquilla* by its very inflated, sulcate telson, extremely long dorsal spine on the basal segment of the uropod, and by the greatly disparate relative lengths of the spines on the basal prolongation of the uropod.

The three females differ slightly in several features. Both claws of the holotype have 10 teeth on the dactyli, whereas there are 7 teeth on the left claw and 8 teeth on the right of one paratype and 8 and 9 teeth, respectively, on the claws of the other paratype. Each sulcus on the telson of the holotype consists of a posterior, broad, circular depression connected by the sulcus to an anterior, smaller circular depression; on the other females, however, the sulci are not as distinctly pitted. The holotype has one short median denticle on the posterior margin of the telson, flanked by eight longer submedian denticles on each side; one paratype (USNM 184178) has the short median denticle flanked by seven and eight submedian denticles, respectively, and the other paratype has seven submedian denticles on the right side and eight on the left, but no median denticle. The tubercles between lateral fixed teeth 2 and 3 and between teeth 3 and 4 of the telson are present on the right side only in the holotype; on one paratype (USNM 184177) they are present on both sides of the telson, but the mesial tubercle on the left is barely discernible. On the third female, there is a single tubercle located between teeth 3 and 4 only on the left side. Finally, the dark, circular chromatophore spots on the abdomen are visible only on one paratype (USNM 184177).

DISTRIBUTION.—Known only from Tague Bay, St. Croix, U.S. Virgin Islands, in 6–7 m depths.

ETYMOLOGY.—The specific epithet is derived from the type-locality, Tague Bay, St. Croix.

Nannosquilla whitingi, new species

FIGURES 3*e*,*f*, 8, 9

MATERIAL EXAMINED.—USNM 184179, holotype, 1♀, TL 30 mm; off Hutchinson Island, St. Lucie County, Florida, 27°21.2′N, 80°14.1′W; 7.6 m; MacKay, Ernest, Martin, and Graunke, collectors; 28 September 1978. FSBC I 27679, paratype, 1♀, TL 24 mm; off Hutchinson Island, St. Lucie County, Florida, 27°22.9′N, 80°14′W; 11.3 m; Ernest, Martin, and Whiting, collectors; 5 November 1978. USNM 184180, paratype, 1♀,

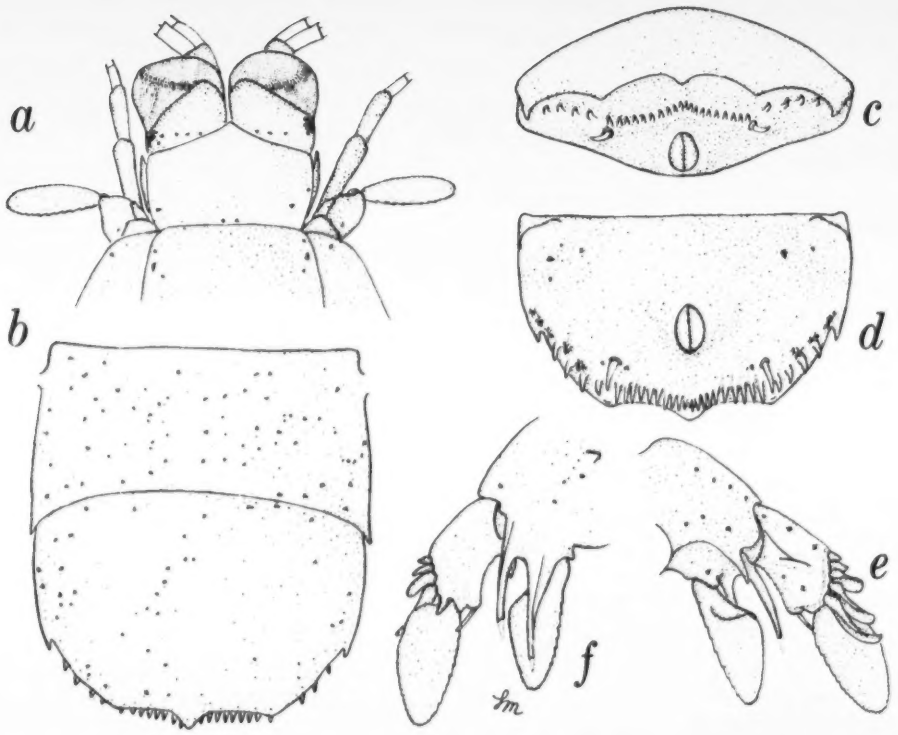

FIGURE 8.—*Nannosquilla whitingi*, new species, female holotype, TL 30 mm: *a*, anterior part of body; *b*, sixth abdominal somite and telson; *c*, telson, posterior view; *d*, telson, ventral view; *e*, right uropod, dorsal view; *f*, right uropod, ventral view.

TL 28 mm; off Hutchinson Island, St. Lucie County, Florida, 27°21.4′N, 80°13.3′W; 11.3 m; Ernest, Minton, and MacKay, collectors; 30 January 1977. USNM 184181, paratype, 1 soft ♂, CL about 3.1 mm; off Hutchinson Island, St. Lucie County, Florida, 27°19.9′N, 80°13.2′W; 8.2 m; Gallagher, Martin, Thomas, and Whiting, collectors; 10 June 1976.

DESCRIPTION.—Eye small, not extending beyond antennular peduncle; cornea set obliquely on stalk, expanded laterally. Ocular scales fused basally; apices distinct, rounded.

Antennular peduncle short, less than half length of carapace; flagella short, upper with 11–12 articles, longer lower with 9–11 free articles, shorter with 4–5 free articles. Antennular processes visible as anteriorly directed spines projecting beyond sides of rostral plate.

Antennal peduncle short, not extending beyond eye; flagellum with 12–14 articles. Antennal scale short, extending beyond midpoint of last segment of peduncle.

Rostral plate subpentagonal, slightly wider than long, covering proximal half of ocular peduncles. Lateral margins of plate convex. Anterolateral corners rounded, almost forming right angle. Anterolateral margins concave, merging to obtuse apex; apex extending well beyond anterolateral corners.

Mandibular palp absent. Four epipods present.

Dactylus of raptorial claw with 11–13 teeth; proximal notch on outer surface of dactylus flanked by subacute proximal lobe and rounded distal lobe. Carpus lacking spine at distal end of upper margin.

Basal segment of walking leg produced as posteromesial lobe.

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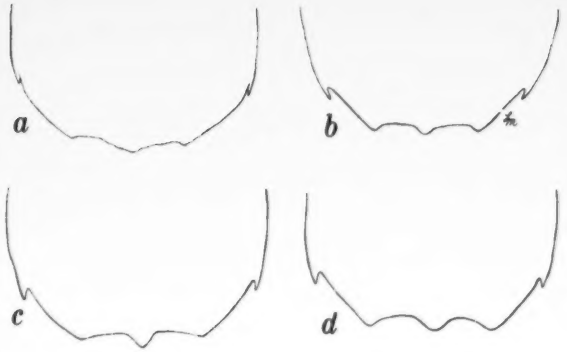

FIGURE 9.—*Nannosquilla whitingi*, new species; variation in shape of posterior margin of telson in: *a*, USNM 184180, female paratype, TL 28 mm; *b*, USNM 184181, male, CL 3.1 mm; *c*, USNM 184179, female holotype, TL 30 mm; *d*, FSBC I 27679, female paratype, TL 24 mm.

Sixth abdominal somite with posterolateral corners produced as elongate, acute spines.

Telson short, wider than long, dorsum smooth. Median projection of false eave narrow, subtriangular, with apex scarcely produced beyond submedian projections. Submedian depressions of eave wide; curvature variable, often forming straight or sinuous line between median and submedian projections or forming arc with radius decreasing medially. Apices of submedian projections of eave narrow, rounded. Marginal armature consisting of occasional single, short denticle on midline and, on either side, 8–10 submedian denticles, 1 movable submedian tooth originating anterior to and lateral of last submedian denticle, and 5 fixed lateral teeth and denticles.

Basal segment of uropod with ventral, proximal tubercle; dorsal spine of basal segment short, not extending to midpoint of endopod; inner spine of basal prolongation longer than outer. Proximal segment of exopod with 2 or 3 nonplumose, stiff setae on inner distal corner and graded series of 5 or 6 spatulate spines on outer distal margin.

Color in alcohol variable, pale tan with few, sparsely scattered chromatophores; many subcircular spots on ocular peduncles; posterolateral margins of telson consistently with irregular dark areas or lines of stellate spots paralleling margins, especially on ventral surface.

SIZE.—TL of females 24, 28, and 30 mm; CL about 3.1–4.7 mm; TL of holotype, 30; other measurements of holotype (in mm): CL 4.7; rostral plate length 1.5, width 1.9; telson length 2.6, width 3.5; antennal scale length 1.0.

REMARKS.—*Nannosquilla whitingi*, like its sympatric congener *N. baliops*, is very similar to *N. grayi*, differing from it by its smaller size, color pattern in preservative, and habitat. *Nannosquilla grayi* is a large species, attaining a size of 42 mm; adults of *N. whitingi* available to us do not exceed 30 mm in total length. The chromatophores on the dorsum of *N. grayi* are large, densely distributed, and stellate (Figures 1*g* and 3*c*, *d*), whereas those on *N. whitingi* are small, less densely distributed, and most of them are nonstellate spots (Figure 3*e*, *f*). Finally, *N. grayi* occurs in shallow intertidal or shallow (3–4 m) subtidal habitats, burrowing in muddy sand, whereas *N. whitingi* is known from poorly sorted, coarse, biogenic sand bottoms, at depths of 7.6–11.3 m.

Nannosquilla whitingi also differs from *N. baliops* primarily in its color pattern in alcohol. The chromatophores on the dorsum of the body in *N. baliops* are stellate, resembling those of *N. grayi* rather than those found in *N. whitingi*.

There is considerable variation in the outline of the false eave of the telson (Figure 9). One specimen appears to have been damaged prior to the last molt before it was collected (Figure 9*a*), resulting in an irregular shape to the median projection of the eave; this shape is not considered as normal variation. The median projection of the smallest specimen (Figure 9*b*) is short, subacute, and very wide anteriorly. It is separated from the submedian projections by almost straight submedian depressions. Another specimen has slightly sinuous depressions on each side of the median projection (Figure 9*c*), and the projection is acute at the apex. The final specimen (Figure 9*d*) has a rounded apex on the median projection, and the shape of the submedian depressions differs from all other specimens, each being in the form of an arc of decreasing radius.

The numbers of teeth on dactyli of the raptorial claws differ not only between specimens but also

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bilaterally on each specimen having both claws intact. Two specimens (USNM 184179 and 184181) have 11 teeth on the left claw; one has 12 teeth on the right claw, and the other (USNM 184181) is missing the right claw. Another specimen (USNM 184180) has 12 teeth on the left claw and 13 on the right. The final specimen (FSBC I 27679) lacks both claws.

There is also variation in the number of submedian denticles on the posterior margins of the telsons. Two specimens (USNM 184179 and 184180) have, in addition to the submedian denticles, a single, shorter denticle set on the midline. These are flanked by either 8 (184180) or 10 (184179) submedian denticles on each side of the midline. The remaining specimens lack the short median projection but have either 9 (USNM 184181) or 10 (FSBC I 27679) submedian denticles on each side.

DISTRIBUTION.—Known only from off Hutchinson Island, Florida east coast, in 7.6–11.3 m depths.

ETYMOLOGY.—The species is named for Nicholas H. Whiting, Applied Biology, Inc., Jensen Beach, Florida, who made the specimens available for study.

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